

EXHIBIT A

PROFESSIONAL SERVICES AGREEMENT

THIS PROFESSIONAL SERVICES AGREEMENT (herein "Agreement") is made and entered into this First (1st) day of November, 2017 (the "Effective Date"), by and between Miller Boat Line, Inc., an Ohio corporation, (herein "MBL") and Elliott Bay Design Group LLC, a Delaware limited liability company (herein "EBDG"). The parties hereto agree as follows:

1.0 SERVICES OF CONTRACTOR

1.1 Scope of Services.

MBL desires to secure certain naval architecture and marine engineering services from EBDG and EBDG desires to render such services to MBL, for the design of a new 140' long ferry boat for operating in Lake Erie, primarily Ottawa County, Ohio, USA.

In compliance with all terms and conditions of this Agreement, EBDG shall provide those design services specified in the "Proposal" attached hereto as Exhibit "A" and incorporated herein by this reference, which design services may be referred to herein as the "services" or "work" hereunder. This Agreement encompasses Phases I and II as set forth in the attached Proposal (pages 1-20 of said Proposal). In the event of any inconsistency between the terms of such Proposal and this Agreement, the terms of this Agreement shall govern. As a material inducement to MBL entering into this Agreement, EBDG represents and warrants that EBDG will perform its work and services in a manner consistent with the applicable standards of practice governing naval architecture and marine engineering in the location where the services are provided.

1.2 Compliance with Law.

All services hereunder shall be provided in accordance with all ordinances, resolutions, statutes, rules and regulations of MBL and any Federal, State, or local governmental agency having jurisdiction in effect at the time service is rendered.

1.3 Licenses, Permits, Fees and Assessments.

EBDG shall obtain at its sole cost and expense such licenses, permits and approvals as may be required by law for the performance of any services required by this Agreement. EBDG shall have the sole obligation to pay for any fees, assessments and taxes, plus applicable penalties and interest, which may be imposed by law and arise from or are necessary for EBDG's performance of the services required by this Agreement, and shall indemnify, defend and hold harmless MBL against any such fees,

assessments, taxes, penalties or interest levied, assessed or imposed against MBL hereunder.

1.4 Insurance.

EBDG shall maintain, during the term of this Agreement, at its sole expense, professional naval architect liability insurance and commercial general liability insurance from a recognized carrier in an amount of at least One Million Dollars (\$1,000,000.00) per occurrence. EBDG shall provide MBL a copy of said insurance policy at MBL's request.

1.5 Familiarity with Work.

By executing this Agreement, EBDG represents that EBDG (a) has thoroughly investigated and considered the scope of services to be performed, (b) has carefully considered how the services should be performed, and (c) fully understands the difficulties and restrictions attending performance of the services under this Agreement. Should EBDG discover any latent or unknown conditions, which will materially affect the performance of the services hereunder, EBDG shall inform MBL within 5 days of such fact and shall continue until written instructions otherwise are received from the Contract Officer.

1.6 Care of Work.

EBDG shall adopt reasonable methods during the life of this Agreement to furnish continuous protection to the work, and the equipment, materials, papers, documents, plans, studies and/or other components thereof to prevent losses or damages, and shall be responsible for all such damages, to persons or property, until acceptance of the work by MBL, except such losses or damages as may be caused by MBL's own negligence.

1.7 Further Responsibilities of Parties.

Both parties agree to use reasonable care and diligence to perform their respective obligations under this Agreement. Both parties agree to act in good faith to execute all instruments, prepare all documents and take all actions as may be reasonably necessary to carry out the purposes of this Agreement. Unless hereafter specified, neither party shall be responsible for the services of the other.

1.8 Limit of Liability and Consequential Damages.

MBL and EBDG agree, to the fullest extent permitted by law, EBDG's total aggregate liability to MBL and all third-parties is limited to the proceeds available from EBDG's professional liability insurance policy for any and all injuries, damages, claims, losses, expenses, or claim expenses arising out of the Agreement from any cause of causes. Such causes include, but are not limited to, EBDG's negligence, errors, omissions, strict liability, statutory liability, breach of contract, breach of warranty,

negligent misrepresentation, or other act giving rise to liability based upon contract, tort, or statute.

MBL shall not be liable to EBDG and EBDG shall not be liable to MBL for any consequential damages incurred by either due to the fault of the other. Consequential damages include, but are not limited to, loss of use and loss of profit.

2.0 COMPENSATION

2.1 Contract Sum

For the services rendered pursuant to this Agreement, EBDG shall be compensated in accordance with the "Schedule of Compensation" attached hereto as Exhibit "B" and incorporated herein by reference. Compensation may include reimbursement for actual and necessary expenses if specified in the Schedule of Compensation.

2.2 Method of Payment.

All invoices are payable within thirty (30) days of receipt. A monthly service charge of one and one-half (1.5%) percent is payable on all overdue balances.

2.3 Modification of Specifications; Change Orders.

Changes to the specifications shall be in writing and signed by a representative of EBDG and MBL. When a change to the specifications will cause a delay in completion of the services, EBDG shall notify MBL of same in writing. Any increased or decreased cost as a result of a change to the specifications shall be communicated and documented in writing and signed by both parties.

3.0 PERFORMANCE SCHEDULE

3.1 Time of Essence.

Time is of the essence in the performance of this Agreement.

3.2 Schedule of Performance.

EBDG shall commence the services pursuant to this Agreement upon receipt of a written notice to proceed and shall perform all services within the time period(s) set forth in the attached Exhibit "C", unless changes to the Schedule of Performance are agreed upon between the parties in writing.

The time period(s) specified in the Schedule of Performance for performance of the services rendered pursuant to this Agreement shall be extended because of any delays due to unforeseeable causes beyond the control and without the

fault or negligence of EBDG, including, but not restricted to, acts of God or of the public enemy, unusually severe weather, fires, earthquakes, floods, epidemics, quarantine restrictions, riots, strikes, freight embargoes, wars, litigation, and/or acts of any governmental agency, if EBDG shall within ten (10) days of the commencement of such delay notify the Contract Officer in writing of the causes of the delay. The Contract Officer shall ascertain the facts and the extent of delay, and extend the time for performing the services for the period of the enforced delay when and if in the judgment of the Contract Officer such delay is justified. The Contract Officer's determination shall be final and conclusive upon the parties to this Agreement. In no event shall EBDG be entitled to recover damages against MBL for any delay in the performance of this Agreement, however caused, EBDG's sole remedy being extension of the Agreement pursuant to this Section.

3.4 Term.

Unless earlier terminated in accordance with this Section 3.4, this Agreement shall continue in full force and effect until completion of the services but not exceeding one (1) year from the date hereof, except as otherwise provided in the Schedule of Performance. Either party may terminate this Agreement if the other party (i) fails to cure any material breach of this Agreement within thirty (30) days after written notice of such breach; (ii) ceases operation without a successor; or (iii) seeks protection under any bankruptcy, receivership, trust deed, creditors arrangement, composition or comparable proceeding, or if any such proceeding is instituted against any such party. In the event of any such termination, EBDG shall be paid for all services rendered to date to the extent that there is not a dispute between the parties over the payment for such services.

4.0 COORDINATION OF WORK

4.1 Representative of EBDG.

The following principals of EBDG are hereby designated as being the principals and representatives of EBDG authorized to act on its behalf with respect to the work specified herein and make all decisions in connection therewith:

Brian King

It is expressly understood that the experience, knowledge, capability and reputation of the foregoing principals were a substantial inducement for MBL to enter into this Agreement. Therefore, the foregoing principals shall be responsible during the term of this Agreement for directing all activities of EBDG and devoting sufficient time to personally supervise the services hereunder. For purposes of this Agreement, unless the foregoing principals leave the employment of EBDG or otherwise become incapable of performing their duties due to matters outside the control of EBDG, the foregoing

principals may not be replaced nor may their responsibilities be substantially reduced by EBDG without the express written approval of MBL.

4.2 Contract Officer.

The Contract Officer shall be such person as may be designated by the President of MBL and at the initiation of this Agreement, Jacob Market shall be Contract Officer. It shall be EBDG's responsibility to assure that the Contract Officer is kept informed of the progress of the performance of the services and EBDG shall refer any decisions which must be made by MBL to the Contract Officer. Unless otherwise specified herein, any approval of MBL required hereunder shall mean the approval of the Contract Officer. The Contract Officer shall have authority to sign all documents on behalf of MBL required hereunder to carry out the terms of this Agreement.

4.3 Prohibition Against Subcontracting or Assignment.

The experience, knowledge, capability and reputation of EBDG, its principals and employees were a substantial inducement for MBL to enter into this Agreement. Therefore, EBDG shall not contract with any other entity to perform in whole or in part the services required hereunder without the express written approval of MBL. In addition, neither this Agreement nor any interest herein may be transferred, assigned, conveyed, hypothecated or encumbered voluntarily or by operation of law, whether for the benefit of creditors or otherwise, without the prior written approval of MBL. In the event of any such unapproved transfer, including any bankruptcy proceeding, this Agreement shall be void. No approved transfer shall release EBDG of EBDG of any liability hereunder without the express consent of MBL.

4.4 Independent Contractor.

Neither MBL nor any of its employees shall have any control over the manner, mode or means by which EBDG, its agents or employees, perform the services required herein, except as otherwise set forth herein. MBL shall have no voice in the selection, discharge, supervision or control of EBDG's employees, servants, representatives or agents, or in fixing their number, compensation or hours of service. EBDG shall perform all services required herein as an independent contractor of MBL and shall remain at all times as to MBL a wholly independent contractor with only such obligations as are consistent with that role. EBDG shall not at any time or in any manner represent that it or any of its agents or employees are agents or employees of MBL. MBL shall not in any way or for any purpose become or be deemed to be a partner of EBDG in its business or otherwise or a joint venture of a member of any joint enterprise with EBDG.

5.0 RECORDS AND REPORTS

5.1 Reports.

EBDG shall periodically prepare and submit to the Contract Officer such reports concerning the performance of the services required by this Agreement as the Contract Officer shall require. EBDG hereby acknowledges that MBL is greatly concerned about the cost of work and services to be performed pursuant to this Agreement. For this reason, EBDG agrees that if EBDG becomes aware of any facts, circumstances, or events that may or will materially increase or decrease the cost of the work or services contemplated herein, EBDG shall promptly notify the Contract Officer of said fact, circumstance, or event and the estimated increased or decreased cost related thereto.

5.2 Records.

EBDG shall keep, and require subcontractors to keep, such books and records as shall be necessary to perform the services required by this Agreement and enable the Contract Officer to evaluate the performance of such services. The Contract Officer shall have full and free access to such books and records at all times during normal business hours of MBL, including the right to inspect, copy, audit, and make records and transcripts from such records. Such records shall be maintained for a period of three (3) years following completion of the services hereunder, and MBL shall have access to such records in the event any audit is required.

5.3 Ownership of Documents.

Except for those design details and elements pre-existing the services and work provided herein, all drawings, specifications, reports, records, documents and other materials prepared by EBDG, its employees, subcontractors and agents in the performance of this Agreement shall be the property of MBL when EBDG has received compensation therefore, in whole or in part, and shall be delivered to MBL upon request of the Contract Officer or upon the termination of this Agreement, and EBDG shall have no claim for further employment or additional compensation as a result of the exercise by MBL of its full rights of ownership of the documents and materials hereunder. For those design elements and details that pre-exist the services provided herein, EBDG grants to MBL a non-exclusive, irrevocable license to use such details and design elements for the construction, use, or maintenance of the project. Any use of such completed documents for other projects and/or use of uncompleted documents without specific written authorization by EBDG will be at MBL's sole risk and without liability to EBDG and MBL will indemnify EBDG from any claims or actions by third parties brought as a result of such use. EBDG may retain copies of such documents for its own use. EBDG shall have an unrestricted right to use the concepts embodied therein. All subconsultants shall provide for similar assignment to MBL of any documents or materials prepared by them, and in the event EBDG fails to secure such assignment, EBDG shall indemnify MBL for all damages resulting therefrom.

5.4 Release of Documents.

The drawings, specifications, reports, records, documents and other materials prepared by EBDG in the performance of services under this Agreement shall not be released publicly without the prior written approval of the Contract Officer.

6.0 ENFORCEMENT OF AGREEMENT

6.1 Ohio Law; Venue; Attorney's Fees.

This Agreement shall be construed and interpreted both as to validity and to performance of the parties in accordance with the laws of the State of Ohio and shall not be construed more strictly against one party than against the other because it may have been drafted by one of the parties. In the event any legal proceedings arise under this Agreement: (1) venue for any state legal proceedings shall be in a court of competent jurisdiction located in Ottawa County, Ohio; (2) venue for any federal legal proceeding shall be in the federal court for the United States District Court Northern District of Ohio, Toledo, Ohio; and (3) each party shall bear its own attorney fees, including appeals.

6.2 Waiver.

No delay or omission in the exercise of any right or remedy by a nondefaulting party on any default shall impair such right or remedy or be construed as a waiver. A party's consent to or approval of any act by the other party requiring the party's consent or approval shall not be deemed to waive or render unnecessary the other party's consent to or approval of any subsequent act. Any waiver by either party of any default must be in writing and shall not be a waiver of any other default concerning the same or any other provision of this Agreement.

6.3 Rights and Remedies are Cumulative.

Except with respect to the rights and remedies expressly declared to be exclusive in this Agreement, the rights and remedies of the parties are cumulative and the exercise by either party of one or more of such rights or remedies shall not preclude the exercise by it, at the same or different times, of any other rights or remedies for the same default or any other default by the other party.

6.4 Legal Action.

In addition to any other rights or remedies, either party may take legal action, in law or in equity, to cure, correct or remedy any default, to recover damages for any default, to compel specific performance of this Agreement, to obtain declaratory or injunctive relief, or to obtain any other remedy consistent with the purposes of this Agreement.

7.0 NON-DISCRIMINATION

7.1 Conflict of Interest.

No officer or employee of MBL shall have any financial interest, direct or indirect, in this Agreement nor shall any such officer or employee participate in any decision relating to the Agreement which affects his financial interests or the financial interest of any corporation, partnership or association in which he is, directly or indirectly, interested, in violation of any State statute or regulation. EBDG warrants that it has not paid or given and will not pay or give any third party any money or other consideration for obtaining this Agreement.

7.2 Covenants Against Discrimination.

EBDG covenants that, by and for itself, its heirs, executors, assigns and all persons claiming under or through them, that there shall be no discrimination against or segregation of, any person or group of persons on account of race, color, creed, religion, sex, marital status, national origin, or ancestry in the performance of this Agreement. EBDG shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, creed, religion, sex, marital status, national origin, or ancestry.

8.0 MISCELLANEOUS PROVISIONS

8.1 Notice.

Any notice, demand, request, documents, consent, approval, or communication either party desires or is required to give to the other party or any other person shall be in writing and either served personally or sent by prepaid, first-class mail, in the case of MBL, to the attention of the Contract Officer, and in the case of EBDG, to the person at the address designated on the execution page of this Agreement. Either party may change its address by notifying the other party of the change of address in writing. Notice shall be deemed communicated at the time personally delivered or in seventy-two (72) hours from the time of mailing if mailed as provided in this Section.

8.2 Interpretation.

The terms of this Agreement shall be construed in accordance with the meaning of the language used and shall not be construed for or against either party by reason of the authorship of this Agreement or any other rule of construction which might otherwise apply.

8.3 Integration; Amendment.

It is understood that there are no oral agreements between the parties hereto affecting this Agreement and this Agreement supersedes and cancels any and all previous negotiations, arrangements, agreements and understandings, if any, between the parties, and none shall be used to interpret this Agreement. This Agreement may be amended at any time by the mutual consent of the parties by an instrument in writing.

8.4 Severability.

In the event that any one or more of the phrases, sentences, clauses, paragraphs, or sections contained in this Agreement shall be declared invalid or unenforceable by a valid judgment or decree of a court of competent jurisdiction, such invalidity or unenforceability shall not affect any of the remaining phrases, sentences, clauses, paragraphs, or sections of this Agreement which are hereby declared as severable and shall be interpreted to carry out the intent of the parties hereunder unless the invalid provision is so material that its invalidity deprives either party of the basic benefit of their bargain or renders this Agreement meaningless.


8.5 Corporate Authority.

The persons executing this Agreement on behalf of the parties hereto warrant (i) such party is duly organized and existing, (ii) they are duly authorized to execute and deliver this Agreement on behalf of said party, (iii) by so executing this Agreement, such party is formally bound to the provisions of this Agreement, and (iv) entering into this Agreement does not violate any provision of any other Agreement to which said party is bound.

IN WITNESS WHEREOF, the parties hereto have entered into this Agreement as of the date first written above.

MBL:

MILLER BOAT LINE, INC.
an Ohio corporation

By: 
Scott E. Market
Vice-President

EBDG:

ELLIOTT BAY DESIGN GROUP LLC
a Delaware limited liability company

By: _____

Joe Pritting
President

Address: 5305 Shilshole Ave NW, Suite 100
Seattle, WA 98107

EXHIBIT "A"

EBDG Proposal Dated 10/4/17

Pages 1 – 20

A. PROPOSAL



Executive Summary

Elliott Bay Design Group (EBDG) is pleased to offer this proposal to Miller Boat Line (MBL). As a family-owned and operated business, providing safe, efficient and reliable service is the critical mission. Your diverse ridership depends on your service and investing in your fleet has a significant impact on your bottom line. MBL is experiencing growth and this new ferry investment must sustain and promote this growth. With significant financial resources allocated for this project, your money has to be spent in a way that allows you to achieve all of your goals and objectives. As specialists in passenger/vehicle ferry design, we understand your unique challenges and can design a vessel that will deliver the mission.

Path to Success – Partnership

A successful project requires that the Owner, Naval Architect and Shipyard are all working together throughout the project with a common purpose. All three parties want a vessel that they can be proud of: well built, performs, and delivered on time and for the contracted price. From long experience and continuous improvement with new build projects, the design and services package that EBDG is proposing to MBL results in the most successful new boat acquisition. The EBDG brand is "Better to Build – Better to Operate". This is not just a slogan for us. We gain insights from every project that we do and carry that continuous improvement into the next project – your project.

Path to Success – Contracting Approach

When an Owner is embarking on the process of obtaining a new boat, a fundamental decision is what type of the contract process is best. The MBL Request for Proposal (RFP) describes the intent to have a Design-Bid-Build contract. This contracting method allows the Naval Architect, under the direct control of the Owner, to create Regulatory Design Specifications and Drawings that enable the Shipyard to prepare a firm bid and to successfully build a vessel. In this proposal EBDG describes a Regulatory Design that is sufficiently comprehensive and detailed so the Shipyard can then build the vessel with minimal design decisions. The package is also suitable for United States Coast Guard (USCG) submittal for approval. We agree with MBL that the Design-Bid-Build contract is the best choice for your project.

Keys for Success – Ferry Design Expertise

Design and engineering is cheaper on paper rather than steel. This proposal provides for a Regulatory Design that we then carry through to USCG regulatory submittal and approval. Beyond that, we offer options, depending upon MBL's desire, to provide shipyard lofting and Owner's representation and construction contract management. The EBDG team is comprised of experienced, professional staff well-qualified to perform all facets of naval architecture and marine engineering for this project. The team experience and skills range from initial concept

development and project definition through construction contract management and vessel delivery. Other EBDG staff will supplement the designated team with design, review, research and administrative support as needed or where specialized expertise may be warranted. All of the key personnel are very experienced in passenger vessel design and construction, and have intimate knowledge of USCG Subchapter K vessel requirements, including supporting regulations and standards.

Ferry projects are unique in a number of ways:

- Unlike tugs, barges and tankships, ferries are all uniquely suited to the fixed routes, terminals and areas they serve. It is very rare that a ferry designed for one customer is well suited to the needs of another customer or another location.
- Ferries are highly regulated. Safe transport of passengers is always the first concern of the USCG and the Owner. It must also be the first concern of the firm that designs the vessel.
- Ferries work on fixed schedules. They must be robust and absolutely reliable. A significant delay for a repair is not just deferred revenue, it is lost revenue.
- Ferries represent a substantial capital investment by the Owner. Consequently, ferries need to be designed for long life, often 40 years or more, and they need to be designed with an understanding of how they can easily adapt to changing service conditions over their lifespan. Even if a ferry stays on the same route over its entire life, there will certainly be major equipment replacement, new regulations that need to be adapted and hopefully increased ridership.

EBDG understands all of this and incorporates that understanding into every ferry that we design. We design more ferries than any other Naval Architecture firm in North America. All of that experience, and our willingness to learn from our customers and the shipyards that we work with, make us very good at what we do. Our customers think so too. Eighty-seven percent (87%) of our projects come from repeat customers. The experience we bring not only translates to a well-designed ferry but also a successful construction contract. One indicator of a successful contract is the cost of change orders relative to the original contract value. For EBDG, the cost of change orders has averaged under 3% of the original contract value. Our most recent projects have been even better. For the WOODS HOLE delivered in 2016, the final amount for change orders was 2.2%, with all but .8% being Owner elective. For the Texas DOT Port Aransas ferry and the Alaska Class Ferry, both nearing completion, change orders are projected to total under 1%.

As you consider each Naval Architect's proposal, please consider their complete offering. Consider the team knowledge and the rapport you develop with them. MBL will need to be working closely with the Naval Architect team over the next year and a half. We believe that by choosing EBDG you will be choosing your best value that will almost certainly result in your lowest overall new boat project acquisition cost. By choosing EBDG, we believe that the result will be: a fair shipyard contract price with the least number of change orders; a vessel that is the most efficient to operate both in fuel consumption and overall lifetime maintenance cost;

and a vessel that will serve your operation well now and into the future as your ridership continues to grow.

Design Intentions

In consideration of the Needs and Wants described in the RFP, EBDG has developed the Notional Profiles and Arrangements Drawing included with this Proposal in Section B Drawings/Addenda. We believe that it provides a good foundation for moving into the Initial Design Phase of the project where we will have the opportunity to involve MBL as design development proceeds. The Notional Arrangements has addressed each of the Needs and, to the extent feasible, we have taken it beyond the Needs to also address the Wants.

Regulatory Requirements

The ferry will be a USCG Subchapter K inspected passenger vessel and will admeasure under 100 GRT. Since the Wants describe a capacity of greater than 600 passengers, a number of additional regulatory requirements are invoked. Chief among these include:

- Stairway and stair tower requirements of Subchapter H (large passenger vessel regulations)
- Emergency generator
- Fire pump and fire main must meet many of the requirements of Subchapter H
- The two required bilge pumps need to be located in separate watertight compartments

The Notional Arrangements incorporate the higher level requirements for carrying more than 600 passengers based upon our experience and preliminary conversations with the USCG MSC regarding how these regulations will be applied.

Principal Dimensions and Hull Form

The Notional Arrangements provide for a hull of 140' length overall and 38.5' beam over guards. We need every bit of that to meet the vehicle capacity requirements and allow for ADA access. The radiuses at the corners of the bow and stern are similar to the PUT-IN-BAY. Hull depth is nominally 10'. Hull shape, particularly below the waterline, has not been determined. The hull shape must be carefully developed. Consideration must be given to:

- Maximum draft at full load not exceeding the water depth available at your terminals during low water level conditions of the lake
- Maximum (lightship) and minimum (loaded) freeboards not exceeding the range of reasonable ramp pitch at your terminals during all typical lake water level conditions
- Maximum lightship draft of 7' for winter layup draft restriction
- Longitudinal center of buoyancy reasonably close to longitudinal center of gravity at all loading conditions to avoid excessive aft drag

- Hull form at the aft end to provide good water inflow to propellers and rudders and provide for minimal hull resistance at speed
- Hull form forward to cleave and clear ice and to provide for minimal hull resistance at speed, and also to allow for installation of a bow thruster
- Hull form at the aft end and possibly in cross section to allow a safe location for the keel coolers protected from impact
- Cross section of the hull to minimize roll and possibly allow for the installation of bilge keels to not extend below the bottom or extreme side of the vessel
- Cross section of the hull to be as fine as possible for minimal hull resistance while still allowing sufficient buoyancy to support a full load and not exceed the maximum allowable draft

Hull form will be largely determined during the initial design but will continue to evolve in the subsequent design phase as the vessel weight and center of gravity becomes better defined.

We believe that the PUT-IN-BAY has too much weight aft for efficient operation. This is hard to avoid given the configuration of the vessel. In the Notional Arrangements, we have moved the center of mass of the superstructure forward to reduce the distance between the center of buoyancy and the center of gravity.

We are not sure if your existing boats have deck camber. We recommend that this new design have some camber on both the Main Deck and the exterior of the Upper Deck. Camber will help clear the decks of standing water and reduce ice buildup during cold weather.

The bulwarks will be configured much as they are on the PUT-IN-BAY including the side port gates and the mooring bitts on the bulwark cap instead of on the deck. The mooring bitts will be located to match line leads to your terminals as they are now configured and to provide for vessel pivoting. To reduce the wind driven spray and deck wetness we have elevated the bulwarks at the bow for MBL consideration.

The boat will include a means of rescue davit and Jason's Cradle or similar configuration for man overboard recovery. We believe that with these provisions, the excellent maneuverability and the very good sight lines provided from the Pilothouse, MBL will be able to demonstrate that the vessel can serve as the means of rescue and thereby avoid having a rescue boat. We have also located the means of rescue davit so that it can serve for anchor recovery.

Structure

The vessel will be steel throughout. It will be transversely framed on 30" centers. Through long experience we have learned that 30" frame spacing works very efficiently with tonnage framing for vessels that admeasure under 100 GRT. The Main Deck structure will add half frames to support the vehicle deck loads without plate deformation. Side shell and fore end structure will

have thicker plate and be reinforced for working in clear, strong ice up to 12". The structure will be designed for an assumed life span of 40 plus years with adequate maintenance.

General Arrangements

Priority focus early in the initial design phase will be developing the arrangements with MBL. The Notional Arrangements provides a basis for discussion, not an end point. We want to design a vessel that works best for MBL. Your input is essential to that goal. No one understands your operational needs better than you. Establishing the arrangements with MBL early on is absolutely necessary for us to proceed efficiently with design development. As an example, we cannot proceed with HVAC calculations until the arrangements are determined and we cannot size the generators until the HVAC cooling and heating loads are known. The structural design also is dependent upon knowing the vessel arrangements. While the significant decisions should be determined early in the initial phase, minor arrangement changes are inevitable and expected through the initial and subsequent design phases as we refine the design and have better definition of the impacts from the interior outfit, tonnage and structure.

The Notional Arrangements provide for the following capacities. All capacities are approximate:

- Total number of passengers 707
- Total Passengers on Upper Deck (seated) 178
- Passengers in Upper Deck Cabin (seated) 64
- Passengers in Main Deck ADA Cabin 14
- Total Passengers on Main Deck (no vehicles) 442
- Total number of vehicles
 - Standard Cars 25*
 - 65' Tractor-trail freight trucks 4
- * See Passenger and Vehicle Loading and Unloading below

Four 150 person capacity life rafts are stowed in racks on the aft end of the Upper Deck accessible to a fork lift. The USCG only requires that life rafts be sufficient for 2/3 of the total persons onboard. In practice, the number of persons this vessel will be certified to carry will be determined from USCG required calculations using the deck square footage, rail length and number of seats and egress route widths. Passenger capacity may also be dependent upon the number of crew the vessel carries (we have assumed five or six). Ultimately, the passenger capacity will be a decision made by the OCMI.

The Notional Arrangements provide for an ADA accessible passenger cabin and restroom on the Main Deck. The Main Deck cabin will have air conditioning and passenger seating. A full length 3' wide ADA lane will be demarcated on the Main Deck to provide access from the vehicles to

the ADA accessible cabin and restroom. The ADA accessible cabin will include folding seats to provide for a second wheelchair. By having an ADA passenger cabin accessible from the Main Deck, no elevator will be required. We have also provided for an ADA sized restroom on the Upper Deck. This is also sufficiently sized to serve as a family restroom.

A small Crew Day Room is provided at the main entrance to the Engine Room. The Day Room will be outfitted with a settee, lockers and foul weather gear hangers sufficient for roughly nine people.

The Notional Arrangements provide for a Pilothouse with visibility in all directions that is much improved over your current boats. It is also air conditioned and is larger, providing comfortable room for the Captain and two or three additional crew. The Pilothouse is positioned over the Passenger Deck with a segregated access stair for improved security. To the extent feasible, the control console will use similar controls and communication and be in the same location as your other boats for familiarity to operators that must switch between boats. The Pilothouse outfit and electronics will comply with regulatory requirements and as described by the RFP. Current version equipment compatible with or common to MBL's other vessels will be selected when available.

Lighting

With exception of the Jabsco search lights and possibly some other specialized lights, we intend to use LED lighting throughout. Navigation lights will be McDermott TB2 and TB5 LED lights where appropriate, or other MBL preference. Cabin lighting will be LED style integrated into the ceiling panel system. E-lights will be on a common 24 VDC system or utilize battery ballasts installed so they only come on upon loss of power, not when a lighting circuit is deliberately switched off. All lighting from the Main Deck and above will be controlled from the Pilothouse.

Insulation, Linings and Furnishings

Structural fire protection insulation will be provided where required by regulatory requirements. Acoustic and thermal insulation will be provided elsewhere at cabin boundaries or wherever a space is air conditioned.

We have teamed with Directions in Design (DID) to select interior ceiling, lighting and wall linings in all passenger spaces. They will select the type of lining systems and finish choices working with MBL to determine preferences. DID will also select seating and other furnishings in the passenger and crew spaces.

Passenger and Vehicle Loading and Unloading

Your current vessels are hindered in their passenger embarkation and disembarkation times by the stair arrangements to the Upper Deck. The Notional Arrangements has widened the stairs which will help to some degree, but we have also added a third stair. Multiple points of egress are the best way to significantly reduce the embarkation and disembarkation times. The third stair does displace one vehicle, reducing the deck capacity to 25 nominal vehicles. We have

also provided for the future potential embarkation and disembarkation from the Upper Deck aft port and starboard corners should you decide to add a Passenger Only ramp to your terminal. This capability will only require minor modifications to the vessel in the future.

Vehicles will load over the bow and stern using ramps installed on the vessel as they do now with your current vessels. The ramps will be hydraulically actuated with controls adjacent to the ramp. This vessel will adopt the design currently used. The ramps can be made wider or longer if needed. The Notional Arrangements provide for commercial vehicles of approximately 15'-6" in height.

Noise

The PUT-IN-BAY is a noisy vessel. The primary sources of noise are the exhaust systems and hydraulic system. For the Notional Arrangements, we have chosen to keep the exhaust pipe runs as straight as possible. We have kept the exhaust pipe from running in the overhead of the Vehicle Deck and through the cabin as is done on your current boats, both of which contribute to the noise levels in those areas. Our Notional Arrangements create an offset stack but we can reroute it to centerline if you desire. We also intend to use vertically oriented critical grade spark arresting silencers. With noise reduction, attention to the details counts. We will be sure that the pipe hangers and silencers are all resiliently isolated to reduce structural borne noise. The pipe routing we have chosen to use also allows for slightly larger diameter pipe, contributing to noise reduction. The straight route and relatively low velocity will also provide improved fuel efficiency by reducing exhaust back pressure at the engine.

The hydraulic systems onboard will be the steering gear, ramps and the bow thruster. Most of the hydraulic noise you hear on the PUT-IN-BAY is structural borne. This noise can be significantly reduced by ensuring that pipe penetrations through decks and bulkheads, and hangers are resiliently isolated. We will also make sure hoses are used between the pumps and equipment and the piping, and that hydraulic noise suppressors are included in the design.

The noise levels cited in the Needs section are not to current practice and generally unacceptably high. Even the Wants section noise levels are above current standard practice. We recommend and will make as part of our design goals: 75 dBA on the Vehicle Deck and 65 dBA in the Passenger Cabins and Pilothouse.

Main Propulsion and Vibration

For the Notional Arrangements, we are showing a three main engine/shaft arrangement. This offers a number of advantages. It is quite possible, subject to USCG approval, that it will allow your vessel to stay in passenger carrying service even if one propulsion system is down for maintenance. It distributes the required thrust to make speed over three propellers reducing blade pressure and propeller induced vibration. The PUT-IN-BAY hull design does not provide good flow to the propellers and possibly puts the propeller blades too close to the hull, inducing vibration. By having three propellers, we have more latitude to optimize propeller diameter and hull interaction. Having a center propulsion shaft will allow for greater thrust to make

speed and for ice breaking. Making the center shaft a controllable pitch propeller (CPP) will allow it to be feathered to reduce drag when the added thrust isn't required and fuel efficiency is the primary concern. When all of the power from the center engine isn't needed for making rated speed it can be used to serve the bow thruster hydraulic pump through an electrically clutched power take-off (PTO) from the front of the engine. We have chosen to use a Hundested CPP system for its simplicity, proven robustness, and the fact that it does not use any hydraulic oil in the propeller hub as is done in other systems.

The engines will be Caterpillar C-18, Tier 3 and nominally rated at 715 HP at 2100 RPM (C rating). Depending upon the speed and power analysis results we may be able to select a more de-rated version. This is much more likely with the three engine installation. This provides common equipment with other vessels in your fleet and avoids EPA Tier 4 engines (rated over 804 HP) with their after-engine exhaust treatment and considerably more cost and complexity. The reduction gears will be either Twin Disc or Reintjes vertical offset and close coupled to the engines. For commonality, we recommend the same reduction gear for all three shafts, even though the center shaft with a CPP does not need a reverse gear.

The bow thruster has been estimated at a 30" tunnel for this proposal. MBL has expressed interest in being able to access the thruster room from the main engine room below decks, but such access is not shown in the Notional Arrangements. The USCG does not typically allow for anything less than a Class 3 Sliding Watertight Door for openings in the main transverse watertight bulkheads of a vessel such as this. Due to the expense of these doors, we have not included them here. We have however had some success in obtaining exemptions from the USCG allowing for the installation instead of Class 1 Hinged Watertight Doors and we will pursue such during the Initial Design Development Phase.

In the Initial Design Phase, we will conduct a preliminary speed and power analysis (using NavCAD). From the speed and power calculations we can determine if the three shaft arrangement is necessary, and, if not, we will drop the center shaft from the design if that is preferred by MBL. We will also develop the preliminary hull lines to the propeller in the initial design phase, along with the major characteristics of the propellers (diameter, number of blade, blade area, and pitch). All of this will be revisited and refined in the subsequent design phase as the vessel's characteristics become better defined, particularly the weight and center of buoyancy requirements. In the initial phase of design, we will also discuss with you the option of putting the outer propellers in nozzles. Nozzles improve low speed thrust and reduce vibration.

Optionally we are offering a computational fluid dynamics analysis (CFD) study of the hull. CFD provides us with the ability to much more accurately determine speed and propulsion power requirements and from that propeller optimization. More to the point, it will enable us to better optimize the stern shape to provide the best possible water flow over the propellers and rudders. With CFD we can actually visualize how the water flows over the propellers and rudders enabling us to interactively improve the flow, minimize disruptions to the flow, and thereby reduce fuel consumption and vibration.

Rudders and Steering

Rudders will be Deflector Marine Rudder (DMR) articulated type. There will be twin rudders, the center shaft not having a rudder. Your current vessels use a Hough power assisted helm pump type steering system. The Hough equipment is now a part of Jastram. We intend to use the same type of system if feasible with the hydraulic pumps served by an electric clutched PTO from each generator set.

Firemain System

The fire pump can be engine driven as requested and can either be powered by a PTO from the main engine itself or from a PTO on the reduction gear. It will be possible to engage the pump's 12 VDC electromagnetic clutch from both the Pilothouse and the Engine Room or the Crew Day Room. The USCG requires a larger, higher head, fire pump for Subchapter K vessels with more than 600 passengers and we have estimated the fire pump requirements to be 200 gpm at 230 feet of head. Only one fire pump is required by the regulations but as desired, the firemain system will be plumbed so the bilge pump can operate as a backup fire pump. Fire stations will be located throughout the vessel as required with 1-1/2" hydrants, hoses, and the required adjustable nozzles. The piping will be arranged to allow the system to be completely drained to prevent the pipes from bursting in cold weather. An international shore connection will be located on the Main Deck to allow the firemain to be charged by external means.

Fire Extinguishing Equipment

The Engine Room will be protected by a CO₂ fixed firefighting system with a manual release. The CO₂ bottles will be located on the starboard side at the Mezzanine Deck. The appropriate type and quantity of fire extinguishers will be located throughout the vessel.

Bilge System

Due to the regulations requiring a high head, high flow, fire pump for Subchapter K vessels over 600 passengers, the bilge pump does not work as the primary fire pump and will need to be a separate self-priming low-head pump. Based on the vessel concept design, the bilge pump capacity is required to be 140 gpm at an estimated 35 feet of head. Two bilge pumps are required by the regulations, and for Subchapter K vessels over 600 passengers, the two pumps are required to be in separate watertight compartments. The bilge pump in the Engine Room will be powered by a PTO from the main engine, and like the fire pump this bilge pump will utilize an electro-magnetic clutch. The second bilge pump can either be located in the void forward of the Engine Room or the Steering Gear Compartment. This bilge pump will be powered by an electric motor. Both pumps will be controlled from the Pilothouse and Engine Room or Crew Day Room.

Main Deck Sprinkler System

The Main Deck area covered by the house, approximately 2800 ft² for the proposed concept design, is to be protected by a manual release sprinkler system. With this size footprint, regulations allow for up to three sprinkler zones. Separating the system into three zones allows

for a smaller pump to be utilized. We have estimated that a 10 hp centrifugal pump capable of producing 200 gpm at 90 feet of head will be sufficient. The pump is to be located in the Engine Room with its own dedicated sea chest suction. One location for the system control manifold is on the Upper Deck underneath the stairs to the Pilothouse, as the system controls are to be located in a space not made inaccessible in the event of fire in the space protected. If so desired, the number of zones can be reduced and a larger sprinkler pump can be used.

Black Water Holding, Flushing and Potable Water

Two black water tanks will be provided as required by the RFP. Each will have 1000 gallons of useable capacity. One will be arranged to overflow into the other, and each will be fitted with a vacuum pump off from the Main Deck. The pump off connections will be co-located with the fuel oil filling station. The vacuum pump-off connection piping will be arranged for venting and drain back to provide clean hose disconnection when pump-off is complete. Each tank will be fitted with tank level indication and alarming at the levels described by the RFP. We recommend a non-float switch dependent system that cannot foul with solids. Headhunter makes a reliable system that we have used on other projects but will defer to MBL preference. For commonality, the same system would be used for the fuel tank level indication.

A small pump pressure set with bladder tank will be provided to take lake water from the sea chest for use in sanitary flushing and for wash down hoses. Wash down hose bibs will be installed on every deck in a convenient location. One hose bib will be located adjacent to the Pilothouse to provide for window washing.

Potable water for sink hand washing and drinking will be provided through a fill connection near the fuel oil filling station. The potable tank does not need to be large since it does not serve for toilet flushing and wash down. We envision that a 200 gallon independent polyethylene tank located in the Engine Room will be sufficient for potable water storage. Adjacent to the tank, a small pump pressure set will be provided for potable water pressure to the hand wash sinks. The pressure set would be identical to the sanitary pressure pump set for commonality. Hot water can be provided by instant-on hot water heaters located at each sink. Both the sanitary pressure and potable pressure piping would be provided with drain down capability for freeze protection.

Compressed Air

Two 5 HP Quincy reciprocating two-stage air compressors will be provided in the Engine Room for starting air, sea chest blow down, whistle, wipers, and air assist flushing. Two air receivers will be provided adjacent to the air compressors sized to USCG starting air requirements. Accessible water drains will be provided for each receiver.

HVAC

The Engine Room will be served by a supply fan pulling air in from the port side. An exhaust fan will remove air from the starboard side providing for cross ventilation and removing heat from the uptake. The fans will be sized to be adequate for combustion air and heat rejection needs

nominally keeping the engine room under 110⁰ F. Both fans will be vane axial type with speed adjustable VFD drives. Weather louvers will be moisture excluding. Fire dampers will be included behind the louvers that will close upon CO₂ fire suppression release. Depending upon MBL input, the Engine Room, Steering Gear and Bow Thruster Room may also be fitted with space heaters for supplemental heating during layup. We also recommend and intend that all the engines be fitted with jacket water (or block) heating. This is usually sufficient to keep the Engine Room adequately warm.

The Emergency Generator Room will include a space heater and a small exhaust fan for normal ventilation. The emergency generator will use a radiator and engine driven fan for combustion air and heat rejection when operating. Intake and exhaust louvers will be normally closed and will open upon emergency generator starting. The emergency generator engine will be kept warm with a block heater.

The Steering Gear, Bow Thruster Room and the Voids will all be fitted with forced ventilation arranged to intake air on one side and discharge air from the other side for cross ventilation. The ventilation rate will be appropriately sized for the space to reduce condensation and keep the air fresh for safe entry. The vent terminals will be integrated into the bulwarks as is done on your current boats. The CO₂ Room will include a small louver (probably mounted in the door) and an exhaust fan to reduce condensation and keep the air safe for entry.

The following spaces will be heated and air conditioned:

- Pilothouse
- Upper Deck Passenger Cabin & Restroom
- Main Deck ADA Cabin

Depending upon MBL desire, the Crew Day Room at the entry to the Engine Room may also be heated and air conditioned. The Main Deck located ADA restroom would also be provided with heating for comfort and freeze protection though not air conditioned. The Upper Deck restroom would be provided with heating and air conditioning common to the Upper Deck Passenger Cabin.

We recommend that individual heat pump type air conditioning units be used for each of the spaces. For the Pilothouse and the Upper Deck Passenger Cabin, the compressor/condenser units will be located on the house top aft of the Pilothouse and concealed behind fascia plates. The Main Deck ADA Cabin compressor/condenser will be located on the Mezzanine Deck. Heating of these spaces will be accomplished through reverse cycle on the heat pump units supplemented with wall or duct heaters. Ducting will be kept to a minimum but will include fresh and recirculated air for the Main Deck ADA cabin and the Upper Deck Passenger Cabin will include a fan and duct heater (possibly using the space between the ceiling and the structure as the duct). Both restrooms will be fitted with door louver intakes and an exhaust fan discharging

air to the outside. Heated air will be directed at each Pilothouse forward window to reduce fogging.

Fuel Tank and Systems

A single fuel tank with a useable capacity of approximately 6000 gallons will be integrated into the hull structure located forward of the Engine Room. In the Notional Arrangements we have located the tank at about amidships in the vessel to move the center of gravity of the vessel forward. Even though not required by regulation, we do recommend that the bottom of the fuel tank be separated from the bottom shell plate by 36". A fill station with spill containment will be located on the Main Deck, port side forward of the stairs. We will include a tank level indicator at the fuel station and in the Engine Room. High and low level alarms will be provided in the alarm and monitoring system. The emergency generator will be provided with its own small day tank. It will be filled from a small electric pump located in the Engine Room. It will also be fitted with an overflow line returning the fuel to the main fuel tank.

Racor primary filters will be used at the supply to all engines. They will be duplex filters for the main engines and simplex for the generator engines. Even though overkill for the generators, we will use common sized filter elements for all engines.

Scope of Work

Approach & Methodology

The EBDG-developed Regulatory Design will be guided by the following fundamental principles of this project:

- Compliance with USCG regulations for small passenger vessels certificated under 46 CFR Subchapter K
 - The desire to carry more than 600 passengers will invoke some requirements of Subchapter H. Close and early coordination with both the USCG MSC and the OCMI will be required.
- Compatibility with the existing shore side facilities
 - The new vessel must integrate seamlessly with the current loading ramps and winter docks, meaning freeboard and draft restrictions must be understood and adhered to.
- Schedule-driven operations
 - The design must optimize the seating and flow of passenger and vehicles while providing efficient boarding and disembarking. Overriding considerations for the new arrangements will be: compliance with safe refuge requirements, and emergency embarkation.
- An enjoyable and pleasant passenger experience
 - Passenger accommodations must be to current aesthetics and comfortable. ADA accommodations are to be provided, and interior spaces should be light and airy

and allow natural lighting to the greatest extent feasible. Noise and vibration, which can greatly impact passenger comfort, are to be minimized.

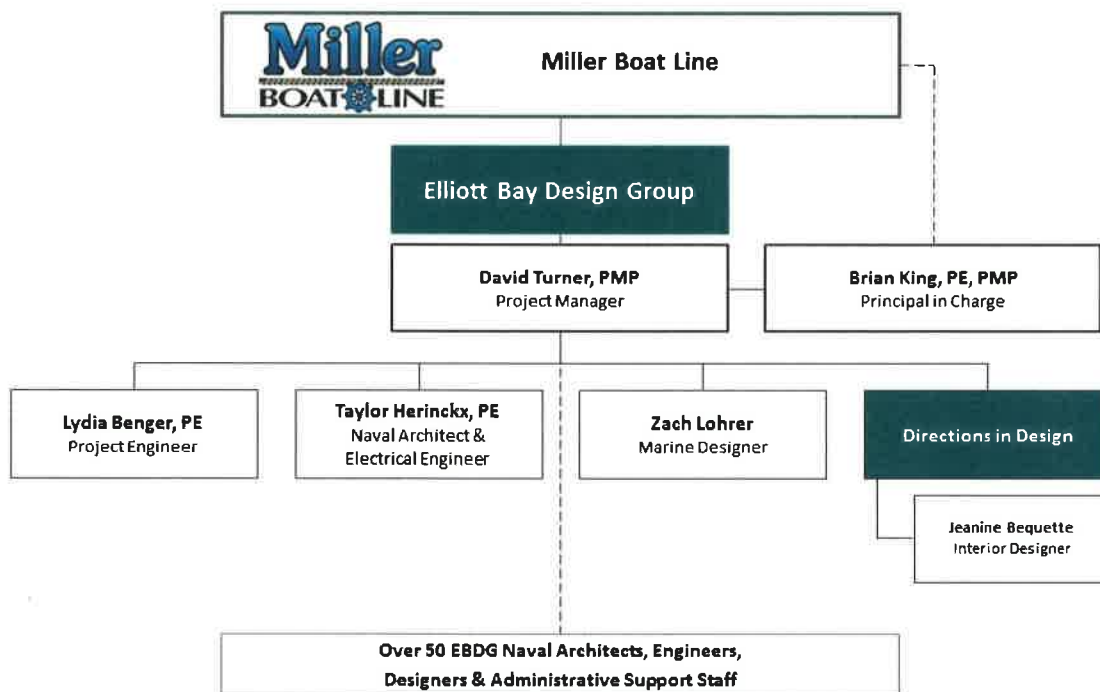
- Economical construction and maintenance
 - MBL will operate the vessel for several decades, and so while the initial build cost must be kept down, the operational life must be considered as well. This may lead to higher initial cost but will provide return on the investment through lower operational and life cycle costs.

The project is broken down into four distinct phases: 1) project kick-off and initial design development, 2) revision design work, 3) construction phase revision design work, and 4) construction oversight.

Project Team

For this project, we offer the below team. This team has been specifically assembled to best address the Needs and Wants along with our Scope of Work. This project has the potential to exercise all of the many core skills of EBDG. Some of the specific skillsets which we anticipate applying in this project include naval architectural stability analysis and weight control, structural design, systems design and pipe flow analysis, and electrical system design.

EBDG is pleased to offer abbreviated resumes for its key team members, with related ferry projects highlighted. Resumes and our Firm Capabilities can be found in Appendix A.



Phase 1: Initial Design Work**Project Kick-Off**

Kicking off a new design project is an exciting time. EBDG anticipates the on-site inspection and pre-work conference to be scheduled as soon as possible at MBL's office following notice of award. This meeting will be attended by the EBDG Project Manager David Turner and Project Engineer Lydia Benger as well as Jeanine Bequette of Directions in Design (DID). Developing good face-to-face working relationships with key personnel will pay dividends in efficient project communications. Even prior to this meeting, EBDG plans to submit to the USCG MSC certain questions pertaining to structural fire protection and emergency escape which are raised by the unique requirements of this vessel design.

Walking the existing vessels will provide an opportunity for the EBDG team to discuss with the vessel management and operators the various attributes that are desirable to be retained and desired improvements to be made. The enclosed Notional Arrangements developed by EBDG for this proposal will also serve to inform discussions.

Initial Design Work

The EBDG team will then review all of the information collected. We will summarize all requirements, evaluate regulatory implications and application, and incorporate all this into the General Arrangements for your further review.

The requirement for a vehicle/passenger ferry potentially carrying over 600 passengers requires some unique regulatory questions be resolved. Once the General Arrangements are substantially agreed upon, EBDG will prepare the Structural Fire Protection and Emergency Escape Plans which are required for vessels certificated under 46 CFR Subchapter K. Preliminary submittal of these to the USCG MSC will further solidify the necessary regulatory compliance. The tonnage characteristics of the vessel will be evaluated at this time as well.

With substantial agreement on the General Arrangements, EBDG will advance the hull form design. During the Project Kick-Off, EBDG will obtain clarification from your team on the draft and freeboard requirements of the vessel operation. Beginning development of the structural drawings and the weight estimate will lead to the development of a suitable Lines Plan and subsequently final location of the water tight bulkheads. Operation of a vehicle ferry with a restricted freeboard range tends to drive the design to a high water plane area. In conjunction with a shallow hull and relatively low displacement, this can lead to challenges in configuring a satisfactory bow thruster installation. This is the time when EBDG will begin to address this issue. Development of the Lines Plan and weight estimate will also enable EBDG to proceed with speed and powering calculations. These calculations will inform the discussion with MBL as to whether the vessel should be fitted with two or three shafts, and whether propeller tunnels or nozzles might be the correct choice.

During Initial Design development, EBDG will create a 3D model of the hull and superstructure. This will be a simple model, created using Rhino modeling software, to enable MBL to better

visualize the spaces and overall vessel configuration. Only major structural members exposed in the Vehicle Deck are anticipated to be modeled at this time.

Finally, EBDG will create an Electrical Loads Analysis to confirm generator sizing.

Initial Design Submittal

Submission of the Initial Design Work phase deliverables (all Preliminary) to MBL will constitute completion of the Initial Design Work. This is estimated to be approximately 30% of regulatory design completion. MBL will conduct the first formal review of the design and a meeting will be scheduled at MBL's facility to be attended by the EBDG Project Manager and Project Engineer. We note in the RFP this meeting was scheduled for January 16th. We believe this meeting should occur no later than early December. A first review earlier in the design effort will streamline development and help ensure the project stays on track with your requirements and preferences.

Meetings

Along with the meetings identified below, EBDG has budgeted for scheduled weekly telephone meetings between the EBDG Project Manager and Project Engineer, and the MBL Project Manager.

- Pre-Work Conference
- First Review meetings at MBL's facility

Deliverables

The deliverables for the Initial Design Work phase are:

- General Arrangements
- Structural Fire Protection Plan
- Emergency Escape Plan
- Lines Plan
- Floodable Length Memorandum
- Speed and Powering Memorandum
- Tonnage Memorandum
- Electrical Loads Analysis

Phase 2: Revision Design Work

Following the first review meeting, EBDG will immediately proceed with the Revision Design Work developing it to a regulatory level. This package serves two purposes. First, it will be used by MBL in the solicitation of firm fixed-price bids from shipyards interested in constructing

the vessel. Once a shipyard contract has been awarded, the majority of the design package will be submitted to the USCG MSC for regulatory review.

Once review comments are incorporated into the General Arrangements, this drawing will be released to DID to proceed with the Interior Design Package. DID is an industry leader in interior design and furnishings. They will ensure that both the EBDG and MBL teams are fully engaged in the options and in selecting interior outfitting that is durable, is regulatory-compliant, and contributes to an outstanding passenger experience. EBDG may also incorporate DID-developed design work into the Regulatory Design documents where appropriate.

Each of the Initial Design Work deliverables will be revised during this phase to incorporate review comments as part of design development. The EBDG Drawings and Contract Specification will be sufficiently accurate and comprehensive to provide a shipyard with enough information to bid to, and also to gain USCG regulatory approval. The EBDG title block and drawing standards will be used throughout. Drawing revisions will be tracked following the first PE sealed release at the conclusion of this phase.

Following is a general description of the drawing and document content for specific categories of drawings:

- General Arrangements - Drawings will conform with ADA guidelines and USCG requirements for safe refuge, fire zones and egress.
- 3D Model - The simple 3D model created during the Initial Design phase will now be further developed to provide a clear notion of the final vessel's configuration and appearance. Images suitable for your marketing purposes will be exported from the model, examples of which may be seen elsewhere in this proposal such as under Similar Projects in Qualifications.
- Speed and Power Analysis - These analyses will be conducted utilizing the NavCAD software package which is an industry standard design development tool.
- Structural Drawings - Drawings will be accurate to scale and will show the scantlings and general details. The structural design will be developed in accordance with ABS Rules for Building and Classing Steel Vessels Under 90m in Length and through first principle approach or finite element analysis (FEA), where appropriate. Structural drawings will be of a level of detail appropriate for regulatory review and approval by the USCG MSC.
- Equipment Foundations - Foundation and mounting drawings will be developed for the major propulsion equipment such as engines, gears, stern tube and struts. Generator skids, switchboards, pump foundations, and other such details are reserved for the detailed design phase.
- Piping Drawings - Drawings will for the most part be single line diagrammatic with a symbols table and material schedule. Details will be developed for hull and bulkhead

penetrations. Engine exhaust systems will be two-line and designed in detail and accurate to scale, though with hanging details reserved for Detailed Engineering.

- Vendor-Engineered Systems - Fixed fire suppression and steering will be vendor-engineered systems. EBDG will address these systems in the specification only.
- HVAC - Drawings will be diagrammatic similar to the piping drawings, but will include accurate to scale arrangements and details of ductwork where necessary to fit within concealed spaces behind ceilings and linings. Details will also be developed for the fresh air intake/exhaust louvers including the penetrations, closures and dampers. Heating and cooling load calculations will be developed to support ventilation rates and equipment sizing.
- Electrical - A complete AC one-line electrical diagram and electrical loads analysis will be developed to the panel board level, documenting all electrical equipment and systems, allowing for an agreed upon percentage of spare circuits.
- Doors & Windows - These will be described in the contract specification. A detailed door and window schedule is not included in this phase.
- Tonnage - Changes to the structure and arrangement will be monitored and tonnage calculations will be completed to ensure the vessel admeasurement remains under 100 GRT.
- Weight & Stability - This will be monitored throughout the project to ensure that the final design will remain within the allowable draft, freeboard, and stability envelope. While the weight estimate is not a deliverable in a regulatory design package, it is essential for informing both the speed and powering and the stability calculations.

The EBDG work includes integration of the interior design into our drawings and specifications through our partner DID. DID will function as an integral member of the EBDG team and will serve as the subject matter expert for the vessel's accommodations outfitting.

Regulatory Design Review

MBL has specified second and third design draft reviews scheduled for the 26th of January and the 5th of February, with the final release of the Regulatory Design being on March 23rd. In line with adjusting the January 16th date for the first design draft review, EBDG would plan on discussing adjusting the date for the second review as well.

Whatever the final dates agreed upon for these intermediate reviews, EBDG will submit work in-progress (WIP) prints in PDF format to MBL for review. These prints will be submitted to MBL to solicit comments on specific directions being taken and design work will continue apace. Comments back from MBL on the WIP prints will be required back within one week for fluid incorporation into ongoing engineering. Delays in feedback can result in schedule and budget overages, and are to be avoided.

Meetings

This phase includes no meetings at MBL's office. EBDG has budgeted for scheduled weekly telephone meetings between the EBDG Project Manager and Project Engineer, and the MBL Project Manager. As with any phase of the project, additional meetings may be called by the MBL Project Manager, either on location or remote, and EBDG will make the necessary personnel available on an additional time and materials basis.

Deliverables

The deliverables for this phase will be signed and sealed by one of EBDG's professional engineers and they will be ready for regulatory submittal to the USCG MSC (as appropriate). They will consist of the following:

- Lines Plan
- General Arrangements
- Structural Fire Protection Plan
- Emergency Escape Plan
- Speed and Power Memorandum
- Midship & Typical Sections
- Typical Scantlings
- Superstructure Scantlings
- Scantling Calculations
- Electrical Loads Analysis
- One Line Diagram
- Shafting Arrangements
- Rudder Arrangements
- Engine Fresh Water Cooling Schematic
- Exhaust System
- Fuel System Schematic
- Hydraulic Systems Schematic
- Sanitary System Schematic
- Potable Water System Schematic
- HVAC System Schematic
- Machinery Space Ventilation Diagram
- Firemain and Bilge Piping Schematic
- Sprinkler Piping Schematic
- Tonnage Memorandum
- Stability Assessment

- Contract Technical Specifications
- Directions in Design Interior Design Package
 - General Arrangement
 - Flooring Schedule
 - Furniture Schedule
 - Ceiling and Lighting Schedule
 - Finish Schedule
 - Accessory Schedule

Optional Scope

Computational Fluid Dynamic (CFD) Analysis - EBDG has the in-house capability of conducting a full CFD analysis for hull optimization. This analysis allows EBDG to fine-tune the vessel lines for water flow around the hull and into the propellers, including the decision whether to include and how to optimize the propeller tunnels or nozzles. While this is a computer-based analysis, EBDG has had many opportunities in the past few years to validate the results of these analyses through model tank testing, and ultimately to have the results confirmed in sea trials.

This optional scope would need to be exercised by the beginning of the Regulatory Design phase to avoid re-work from hull modifications.

3D Structural Model - As a part of the internal design development, EBDG will be modeling certain areas of the structure in a 3D model. This is used for exporting both to AutoCAD for the 2D drawing deliverables, and also to finite element analysis (FEA) software for specific analysis. At MBL's option, this model can also be developed as a design deliverable. In such a case, all major scantlings (included in the 2D deliverables) would be included in the model and a 3D pdf file would be included in the phase deliverables. If MBL is unfamiliar with the 3D PDF and how it can be utilized to depict vessel scantlings, EBDG can furnish a sample. This option will drive the scantling detailing well beyond what is contained within the 2D drawings comprising the Regulatory Design, and provides a substantial advance on detailed design of Phase Three.

This optional scope may be exercised at any time up to the third review.

Phase 3: Construction Phase Revision Design Work

This phase begins with shipyard selection support. The EBDG Project Manager and Project Engineer will be available to respond to shipyard questions. We recommend that EBDG serve as the conduit for any such questions to ensure responses are disseminated appropriately to any bidders. Once a shipyard contract has been signed, EBDG will prepare and submit to the USCG MSC the drawings and documents developed during the Design Phase which require regulatory approval. EBDG will liaise with the USCG MSC to secure approvals.

Meetings

No scheduled meetings or travel are anticipated for this phase of design.

Optional Scope

EBDG can provide detailed design services to advance construction of the vessel. The specific scope and consequent cost is highly dependent upon the fabrication methods and design/engineering capabilities of the shipyard selected. Typical services provided at this stage could include lofting, spooling, preparation of purchase technical specifications, detailed vibration analysis, and more.

Lofting - EBDG can complete the structural design of the vessel, the detail engineering required to develop and provide assembly and nested drawings of the vessel structure. The contents of this package are best tailored to the specific shipyard and developed in coordination with the shipyard's build planning. Working with the shipyard build plan, EBDG can organize the nesting to enable the shipyard to be receiving materials in module-specific packages suited to their build schedule. Structural details can also be tailored to suit standard shipyard practices and preferences. Lofting of the structure is a necessary step if the yard is to use CNC cutting of the steel and the detail engineering is a necessary prerequisite to completing the lofting. Following is a description of the lofting effort.

- EBDG will develop all lofting information for this vessel using the ShipConstructor suite of software (SC).
- We will base our work on a fully faired Rhino or Rhino-compatible surface model of the hull form developed during the EBDG Regulatory Design phase.
- We will model in SC all major hull and superstructure decks, bulkheads, frames, shell plate, stiffeners and girders. We will also loft the engine foundations and propulsion machinery which is integrated into the vessel's primary structure. The fuel tank, sewage tanks, and bulwarks will also be lofted. Minor secondary structure such as equipment foundations, masts, and grating supports will not be lofted.
- All major parts within each block shall include common waterline, buttock and/or frame references. Reference lines shall be labeled accordingly.
- All structural shapes will include end-cut and weld seam relief details.
- EBDG will mark all structural components with frame, deck, and other structural intersections. All marks will indicate direction of material thickness. Marking format will balance needed information with reduced cutting table time.
- Plates will be marked for all stiffeners, faceplates, etc. Stiffener marks will include end-nails indicating the extents of the stiffeners and the material throw direction.
- All structural parts will be identified with unique part numbers. Identical parts will have identical part numbers wherever possible.
- All structure will be continuous between major structural bulkheads unless indicated otherwise in the contract plan package and as will fit on available plate.

- All rat-holes, limbers and water-stops will be lofted.
- Cutouts in structure for doorways, port lights, hatches, manholes, and scuppers will be marked wherever exact equipment dimensional information is not available.
- The detail level of the assembly drawing package will be to a commercial construction level. The hull and superstructure will be provided as separate packages.
- EBDG will supply nested plate DXF files for use by the shipyard contractor and steel processor.
- Flat bar stiffeners will be nested. Please note that SC does not permit nested flat bar to be marked with reference lines.
- EBDG will provide standard stock reports identifying the stock type, length and end-cut details of each shape part.
- EBDG will generate detailed SC weight reports for each block identifying the total steel weight and center of gravity. The reports will include weight information for each sub-assembly and part.

Phase 4: Construction Phase Project Management/Oversight

EBDG will provide construction liaison and observation during vessel construction. As with the Construction Phase Revision Design Work, the specific scope and consequent cost is highly dependent upon the specific capabilities of the shipyard selected, but also upon the location and the shipyard's build schedule. The following tasks are examples of what may be included within this phase of the work:

- Contract Obligations - EBDG will develop a master list of documents and requirements described by the contract specifications that is organized in accordance with the construction phases of the vessel. This will be used as a reminder and check off list to the Shipyard and MBL so that obligations are met.
- Contract Interpretation - EBDG will provide the Shipyard with clarification or interpretation of the contract requirements as needed. EBDG will not have authority to delete contract requirements without specific approval by MBL.
- Change Orders - EBDG will review change orders generated by the Shipyard or develop language for change order requests from MBL. We will advise MBL of the change order validity and make recommendations for their acceptance/denial/revision. EBDG will not have authority to approve change orders. Where appropriate, EBDG will negotiate change orders on behalf of MBL. EBDG will keep a change order log to keep track of the status of all change orders.
- Inspect Vessel and Equipment - EBDG will visit the work site to inspect the vessel, arrived materials and equipment, and the Shipyard's processes and procedures. EBDG's on-site presence will be infrequent in the early stages of construction building and increasing during final outfitting and trials. Oversight needs will vary depending on the stage of construction. As an example, structural inspection will include review that structure matches scantling design, structural alignment, fairness, fit-up and detail, weld prep and quality.

- Field Log - EBDG will keep a field log noting all significant events, observations, and discussions with the Shipyard.
- Progress Reports - EBDG will provide periodic progress reports on a monthly basis to MBL. The progress reports will be composed of brief progress statements and will typically include the latest change order log and documentation log as attachments. The progress reports will include the following information:
 - The general state of completion for various elements of the construction.
 - The major equipment that has arrived.
 - The observed labor loading during EBDG's inspections.
 - The general weather conditions.
 - Dates and times of EBDG's presence in the shipyard.
 - Any emerging concerns or problems, including noting other projects in shipyard that may be taking resources, and whatever is deemed appropriate to document.
- Progress Photos - EBDG will take digital photos of progress, problems, issues, etc. and include them in the progress reports to MBL. EBDG will archive digital photos in a project directory by date and description.
- Review Documents and Drawings - EBDG will review all submitted detailed design/shop drawings and all required documents. EBDG will issue a letter or email and/or return a marked-up document to the Shipyard describing it as approved/approved subject to comments/returned for revision.
- Document Control - EBDG will maintain a document log that will be used to track received documents, revision and approval status. The documents will be filed with EBDG. Documents will be filed by category and date sequence for easy retrieval. (All emails will be saved in the job file on EBDG's server, separate from the document log.). This document log will be kept independently of the Shipyard's document control log, and used to cross check the deliverables being provided by the Shipyard.
- Communications - Where possible, communications will be in writing. Any verbal instruction or significant discussions that take place with the Shipyard/USCG will be written to the field log and followed up in email as appropriate.
- Progress Payments - EBDG will review all progress payment requests and advise MBL of their validity.
- Outstanding Items Log - Toward the end of vessel completion, EBDG will keep an outstanding items log to keep track of items that need completion, resolution, changing, etc., in order to complete the project. This log will generally be shared with the Shipyard's project manager so that person is kept well aware of what EBDG considers outstanding issues.
- Testing and Trials - EBDG will verify the Shipyard is demonstrating that all testing and trials and all documentation is completed. EBDG will review and approve test memos, agendas, and other trials documentation and will witness tests wherever possible.

- Certificates, Documentation, Maintenance and Operations Manuals - EBDG shall review manuals and documents intended to be delivered to MBL, or for posting to make sure they are complete and correct.
- As Built Drawing Review - "As Built" drawings will be reviewed to make sure they represent the final vessel as constructed.
- Regulatory Approval Support - EBDG will support the Shipyard in obtaining regulatory approval of any changes to the Regulatory Design during construction. Although the Shipyard shall be ultimately responsible for regulatory review and approval, EBDG will assist with the process by interacting with the on-site USCG inspectors and the USCG MSC, supporting the Shipyard's detail design development.

Phases 1, 2 and 3 are priced separately in response to the RFP requirements. While they are logical break points in the progression of the project they do not stand alone. They must be done consecutively in order to successfully obtain a contract with a shipyard for construction. Phase 4 (Construction Phase Project Management/Oversight) is optional but only to the degree which MBL chooses to execute portions of this phase themselves. We encourage MBL to include and utilize EBDG for this phase to the greatest extent feasible. From considerable experience we know that a better outcome will result when EBDG is at the table and representing the best interests of MBL whether it be negotiating with the shipyard when they are wanting to make changes or "enhancements", interpreting the contract and design drawings, or working with USCG inspectors and representatives when they apply their own interpretation of regulatory requirements. EBDG is able to provide better contract design adherence and a reduced number of change orders when actively engaged with the shipyard, USCG and Owner during the construction phase.

EXHIBIT "B"

Schedule of Compensation



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E. Cost Schedule

Phase 1: Initial Design Work

- EBDG will accomplish the scope of work detailed as Phase 1 for the fixed fee of \$75,000. EBDG will invoice monthly on a percent-complete basis.

Phase 2: Revision Design Work

- EBDG will accomplish the scope of work detailed as Phase 2 for the fixed fee of \$194,000.
- EBDG will accomplish the Optional Scope detailed as CFD Analysis for the fixed fee of \$9,000, if so directed by MBL. If this scope is requested after the commencement of Phase 2, there may be additional fees involved.
- EBDG will accomplish the Optional Scope detailed as 3D Structural Model for the fixed fee of \$12,000, if so directed by MBL. Note that exercising this option will reduce the cost of the Phase 3 Optional Scope noted below as Lofting.

Phase 3: Construction Phase Revision Design Work

- EBDG will accomplish the scope of work detailed as Phase 3 on a time and materials (T&M) basis with an estimated budget of \$10,700. This estimate includes 40 hours for response to shipyard questions, and 24 hours of liaison with the USCG MSC.
- EBDG will accomplish the Optional Scope detailed as Lofting on a fixed fee basis. Because this effort requires coordination with the shipyard to accurately scope, EBDG can at this time offer you a rough order magnitude (ROM) estimate of \$92,000. Once a shipyard has been selected we will be happy to engage with MBL and the shipyard to refine the scope and cost for this effort.

Phase 4: Construction Phase Project Management/Oversight

- Scoping and pricing of this phase will require detailed discussions between MBL and EBDG once the shipyard has been selected. This effort will typically be completed on a T&M basis. At this time, EBDG can state that past similar projects required an ROM effort of \$250,000.

Note that each phase described herein has specific meetings included in the costs provided. Should more meetings be required by MBL, these will be handled on an additional T&M basis. All T&M effort will be billed using EBDG's current billing rates; rate sheet attached.

Invoicing will be on a monthly basis. For fixed-price work scopes this will be on a percent-complete basis, while T&M will be invoiced to date.



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Current Billing Rates:

| | |
|---|---------------|
| Principal | \$210.00/hour |
| Senior Naval Architect/Senior Marine Engineer | \$185.00/hour |
| Naval Architect/Marine Engineer 1 | \$150.00/hour |
| Naval Architect/Marine Engineer 2 | \$130.00/hour |
| Naval Architect/Marine Engineer 3 | \$115.00/hour |
| Naval Architect/Marine Engineer 4 | \$100.00/hour |
| Designer 1 | \$120.00/hour |
| Designer 2 | \$100.00/hour |
| Designer 3 | \$90.00/hour |
| Technician (Admin) | \$75.00/hour |
| Intern | \$65.00/hour |

Evening, weekend, and holiday hours may be subject to additional charges.

Expenses:

| | |
|------------------------|--|
| Reproduction | at cost |
| Postage | at cost |
| Travel | at cost |
| Miscellaneous expenses | at cost |
| Mileage | Federal rate |
| Computer | - Usage \$ 5.00 per hour |
| | - Analytical Software \$25.00 per hour |
| | - Analytical Processing \$80.00 per hour |
| Library Fee | \$500.00 |

Terms: Net 30 Days

EXHIBIT "C"

Schedule of Performance

To be determined